REMARKS

Extension of Time to Respond

A Petition for a 2-month Extension of Time with the applicable fee accompanies this response.

Pending Claims

Claims 1-21, 23-32 are pending in this application. Reconsideration of these claims is respectfully requested in light of the following remarks.

Claim Rejections under Section 103

Claims 1-21 and 23-32 stand rejected under 35 U.S.C. 103(a) as being unpatentably obvious over U.S. Patent No. 5,590,214 (Nakamura) in view of the previously cited Lehman patent (No. 6,394,223). For the reasons given below, applicants submit that the invention as presently claimed in claims 1-21 and 23-32 is patentably distinquishable from Nakamura in view of Lehman, and respectfully request that the examiner's §103 rejection be withdrawn.

Applicants' invention is directed to a loudspeaker horn for use with aligned and relatively widely spaced acoustic power sources, which mitigates undesirable grating lobes associated with line arrays. Grating lobe mitigation is achieved by the introduction of grating lobe mitigation fins in the flared section of the horn between the horn's end walls. The grating lobe mitigation fins are disposed in planes substantially perpendicular to the long dimension of the horn's throat and substantially parallel to the horn's propagation axis, and extend for a substantial distance from the throat of the horn toward the mouth end of the horn's flared section.

The examiner states, incorrectly, that Nakamura teaches a loudspeaker horn (Fig. 4) for use with aligned and widely spaced acoustic power sources. The relative spacing of the

acoustic power sources relate to the wavelength of the of the acoustic signal at the loudspeaker's highest operating frequency. Generally, what defines "widely spaced" is a spacing greater than one wavelength at high operating frequencies. (See paragraphs [002] and [007] of present application.) Nakamura discloses a vertical array type of loudspeaker system having its loudspeaker transducers ("speaker units") mounted to a pair of baffle boards (1, 2) arranged in a "V" to form a V-shaped compression chamber. Nakamura teaches that the speaker units should be small diameter speaker units in relation to the wavelength of the acoustic signal at high frequencies, preferably less than 1.75 cm, that is, less than one wavelength at 20 kHz, and that the effective distance between adjacent speakers units should likewise be small (also less than 1.75 cm). (See Nakamura, col. 3: 61-67 and col. 4: 1-8.) These dimensional requirements are imposed by Nakamura in order to avoid "interference between the arrayed speakers" which "will result in the large peaks and valleys in the radiated sound from [the speaker] array." (Col. 3: 67-67) Thus, contrary to the examiner's statement that Nakamura teaches a loudspeaker horn for use with a relatively widely spaced acoustic power sources, Nakamura teaches just the opposite, that is, to use small, closely spaced acoustic power sources to avoid interference patterns that would be produced by widely spaced sources.

The examiner acknowledges that Nakamura fails to disclose or teach the use of grating mitigation fins, but cites Lehman as supplying this missing teaching. However, Lehman is not directed to the mitigation of grating lobes, indeed there is no mention of grating lobes in the Lehman disclosure. It is equally unclear whether the preconditions for grating lobes are even present in the loudspeaker disclosed in Lehman (driver spacing and orientation). Lehman

describes his arrangement of throats in an arcuate array (col. 3:48-50), and, generally, "arcuate" sources would not produce pure grating lobes.

To determine whether a prima facie case of obviousness exists, it is useful determine whether the prior art references provide some teaching, suggestion or motivation to modify a reference or combine the references to produce the claimed invention. *In re Kahn*, 78 USPQ 1329, 1335 (Fed. Cir. 2006). See also *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. __, 2007 (2007)(the TSM test is not rigid and mandatory formula but provides helpful insights to obviousness). Here, there is no suggestion or motivation for someone skilled in the art to modify the loudspeaker disclosed in Nakamura, and particularly Fig 4 of Nakamura, to include the vertical vanes 81 (Fig. 8) of Lehman. First, there would be no need or incentive to add vanes of any sort to Nakamura since Nakamura teaches to use closely spaced small acoustic power sources, thereby avoiding the production of grating lobes. Indeed, Nakamura teaches away from the invention by effectively cautioning against the use of relatively large and relatively widely spaced sources of acoustic power in an array of aligned sources.

Second, Lehman does not disclose to use its vertical vanes (81) to mitigate grating side lobes. Rather these vanes are provided to adjust energy distribution in the on-axis sound distribution pattern of the loudspeaker. (Lehman, Col. 5: 31-38.) Even if grating lobes were produced by the Lehman loudspeaker (and there is no indication they are), such lobes would not be mitigated in the manner of the invention due to the open waveguides (15, 19). Such an open waveguide structure would allow grating lobes to be produced without mitigation. In short, a solution to the problem of grating lobes is not indicated by Lehman and Nakamura does not produce grating lobes. The combination of Nakamura and Lehman can not be made in a vacuum void of any desire, need or motivation by one of ordinary skill in the art to make

the combination. See *KSR Int'l Co. v. Teleflex Inc.*, *supra*, (slip opinion, p. 14)(A comibination of elements is not rendered "obvious merely by demonstrating that each [element] was, independently, known in the prior art.") Furthermore, where, as here, the proposed modification changes the principle of operation a reference (closely spaced instead of widely spaced tranducers), the references do not extablish *prima facie* obviousness. *In re Ratti,* 123 USPQ 349 (CCPA 1959); MPEP 2143.01(VI).

Thus, applicants respectfully submit that the claimed invention is not unpatentably obvious over Nakamura in view of Lehman. Lehman teaches away from the invention by effectively teaching that the solution to grating lobes lies in the size and spacing of the acoustic power sources, while Lehman provides no motivation for address the problem of grating lobes at all, much less by the use of grating lobe mitigation fins in the manner of the claimed invention.

Therefor, in view of the foregoing amendments and remarks, it is believed that the claims of the present application are in condition for allowance, a request for which is hereby respectfully made.

Respectfully submitted,

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